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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/066,072	02/01/2002	Peter Jivan Shah	010139	2527

23696 7590 01/14/2005

Qualcomm Incorporated
Patents Department
5775 Morehouse Drive
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EXAMINER	
CHOW, CHARLES CHIANG	
ART UNIT	**PAPER NUMBER**
2685	

DATE MAILED: 01/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/066,072	SHAH, PETER JIVAN	
	Examiner	Art Unit	
	Charles Chow	2685	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 August 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,8-14,17-24,26-28,31,33-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6, 8-14,17-24,26-28,31,33-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Office Action for Amendment
Received on 8/3/2004

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claim 31, 33-34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 31, there is no support from drawings for the structural connections, not showing in Fig. 2 and Fig. 6.

   In line 5 of independent claim 31, "an adder" is claimed. The output of the adder is dangling, not defined to couple to anywhere. In the last paragraph of the claim 31, the "first and second adder portions" are claimed, but the outputs of the first and second adder are dangling, not defined to couple to anywhere. Claims 33, 34 are rejected also due to their dependency upon claim 31.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 14, 17-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Tolson et al. (GB 2,343,572).

   Regarding **claim 14**, Tolson teaches a circuit for reduction of distortion in a receiver (Fig. 5,

page 4, third and fourth paragraph), configured to receive a radio frequency rf signal at a selected rf (antenna and filter 1, Fig. 5), the received rf signal being a combined signal containing a desired signal and a jammer signal (unwanted signal residing in the received desired signal), a down converter (3, 6) to selected low frequency (frequency for low pass filter 14-15, IF at 250 MHz), the circuit comprising means for filtering the combined signal at the selected low frequency to remove desired signal (filter 10-11 at the output 8-9, Fig. 5, page 5 first paragraph, the unwanted are passed and the desired are rejected), means for converting the filtered signal to the selected rf signal (the up converter mixer 12, oscillator 7), means for adding the received rf signal and the filtered rf signal to remove the jammer signal (adding rf at adder 5 items 13, 16-17, 18-19, 5 in Fig. 5), coupling the received rf signal to the positive input of an adder (at input to 18) and coupling the filtered signal to a negative input of the adder (at input to 13). Tolson teaches the negative terminal at adder. The adder components, items 18 19, 5, 17, 13, 16 in Fig. 5, are for adding the received combined signal at 18 with the 180 phase shifted unwanted signal at the input of 13, page 5 line 1 to page 7 line 7 from top. The output signal from mixer 12 is connected to the negative input terminal at the input of phase inverter 13 in Fig. 5 for removing the unwanted jammer signal by utilizing adder (18 19, 5, 17, 13, 16 in Fig. 5). Tolson teaches the communication circuit is a quadrature circuit (the quadrature outputs 8, 9, Fig. 5), the down converter (6) that generates first and second quadrature components (8, 9) at selected low frequency (IF at 250 MHz, page 4, line 10 from bottom line), wherein the means for filtering comprises means for filtering first and second quadrature components respectively to thereby generate first and second filtered signal portions respectively (filter 10-11 at the quadrature output 8-9, for

generate filtered respective quadrature outputs , Fig. 5, page 5 first paragraph), the means for converting comprising means for converting the first and second filtered signal portions to the selected RF (the up converter mixer 12 for converting filtered signals from filter 10, 11, page 5, first and second paragraph, Fig. 5), the circuit comprising means for combining the converted first and second signal portion (the mixer 12 provides a single, combined, output to phase shifter 13 (Fig. 5, page 5 second paragraph).

Regarding **claim 17**, Tolson taught the base band I, Q at 8-9 (Fig. 5) and the high pass filters (10-11).

Regarding **claim 18**, Tolson teaches the analog filter (the filters 14-15, 10-11, page 6 lines 5-6).

Regarding **claim 19**, Tolson teaches the wireless communication unit has specified operational bandwidth (page 4, fourth paragraph, the GSM 25 MHz), and filter has filter bandwidth based on the operational bandwidth (selecting pass band for particular mode of operation, page 6, line 10-12, the multi-mode mobile phone, page 1 lines 1-2).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-6, 8-13, 20-24, 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cantwell et al. (US 5,410,750) in view of Tolson (GB 2,343,572 A1).

Regarding **claim 1**, Cantwell et al. (Cantwell) teaches a system for reduction of distortion (Fig. 1-2, abstract) having a combined signal including a desired signal and a jammer signal

(signal (S) + noise (n) + interference (I)), comprising a filter to remove the desired signal and thereby provide a filtered signal representative of the jammer signal (the estimated interference signal at the output of interference detector 18, the LPF 26, 34 for extracting interference for up-converting the interference, Fig. 3, col. 8, line 57 to col. 9, line15), an adder circuit (interference canceller 20) to receive the combined signal and the filtered signal (the received combined signal S+n+I at 20 and the LPS 26, 24, the received interference estimate from interference detector 18, Fig. 2) thereby remove the jammer signal (canceling out the interference signal by the summing function at 20, Fig 2, col. 3, lines 14-19; col.8, lines 23-49), the adder circuit (20) comprises a positive (+" terminal of 20, Fig. 2) and negative input ("-" terminal of 20), the combined signal being coupled to the positive input (delayed S+n+I is coupled to "+" terminal of 20), and the filtered signal being coupled to the negative input (estimated interference signal is coupled to "-" terminal of 20). Cantwell fails to teach the wireless communication circuit, Tolson teaches multi-mode mobile phone (abstract, Fig. 5, page 1 first paragraph), for removing unwanted signals. Tolson teaches a mobile phone can remove the unwanted signal (abstract, Fig. 5), and can be implemented on compact ASIC (page 2, middle paragraph). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Cantwell with Tolson's mobile phone implementation for removing unwanted signal, such that unwanted signal could be implemented to mobile phone with compact ASIC.

Regarding **claim 2**, Tolson teaches the RF receiver (Fig. 5) receiving unwanted signal and the desired signal (unwanted signal in the received signal, title, abstract, Fig. 1-8; page 2, last paragraph to page 3, first paragraph). Tolson teaches the mixer (6) coupled to the adder

(summer 5, figure in cover page), to convert RF to lower frequency, with high pass filters 10-11 for reject the desired signal, as shown above, page 5, first paragraph). Tolson teaches the up mixer 12 (as shown above for converting (figure in cover page) the filtered signal to the selected RF (page 5, second and third paragraphs) for subtracting unwanted at summer 5. Tolson teaches feedback for removing unwanted signal inside the received signal for plurality of different bandwidth, multi-mode capability for a receiver (page 1 last paragraph to page 2 second paragraph from bottom line).

Regarding **claim 3**, Tolson teaches above the GSM communication receiver is a quadrature circuit (I, Q output 8, 9) and quadrature mixer 6. Tolson also teaches the first and second filter 10, 11 (figure in cover page), the first and second quadrature up mixers in 12. Tolson taught the summer coupled to first and second quadrature up mixer (12) having the combined converted first and second signal portions inside mixer 12.

Regarding **claim 4**, Tolson teaches above a receiver for receiving rf signal with the desired and unwanted signals. Tolson taught above a down-mixer (6) for converting rf signal to a selected lower frequency. Tolson taught the filters 10-11 operating at selected lower frequency to reject desired signal. Tolson taught an up-mixer (12) and adder (items 18 19, 5, 17, 13, 16 in Fig. 5, for adding received combined signal from mixer 13 with the 180 degree phase inverted signal from 13. The output signal from mixer 12 is connected to the negative terminal at the input of phase inverter 13, Fig. 5) for removing the unwanted jammer signal by utilizing adder (18 19, 5, 17, 13, 16 in Fig. 5).

Regarding **claim 5**, Tolson teaches a GSM receiver circuit (Fig. 5, Fig. 1-4, Fig. 6-8) is a quadrature circuit (I,Q baseband outputs 8-9, page 4, third paragraph), a quadrature mixer

core (6), the first mixer 3, the second mixer 6, the first and second high pass filters 10-11, the up-mixer 12 for quadrature up conversion.

Regarding **claim 6**, Tolson teaches the splitting the combined converted signal into two quadrature signal I, Q (8, 9, page 4 third paragraph, page 5 first paragraph), the adder circuit comprising fist and second adder portion for adding first split signal, and the combined signal, and the second split signal and the combined signal (the two inputs to summer 5, page 5 third paragraph).

Regarding **claim 8**, Tolson teaches the base band I, Q at 8-9 (Fig. 5) and the high pass filters (10-11).

Regarding **claim 9**, Tolson teaches the analog filter (the filters 14-15, 10-11, page 6 lines 5-6).

Regarding **claim 10**, Tolson teaches the wireless communication unit has specified operational bandwidth (page 4, fourth paragraph, the GSM 25 MHz), and filter has filter bandwidth based on the operational bandwidth (the selecting pass band for a particular mode of operation, page 6, line 10-12, the multi-mode mobile phone, page 1, lines 1-2).

Regarding **claim 11**, Cantwell teaches a method for reduction of distortion (Fig. 1-2, abstract) having a combined signal including a desired signal and a jammer signal (signal (s) + noise (n) + interference (I)), comprising filtering the combined signal to remove the desired signal and thereby provide a filtered signal representative of the jammer signal (the estimated interference signal at the output of interference detector 18, the LPF 26, 34 for extracting interference for up-converting the interference, Fig. 3, col. 8, line 57 to col. 9, line15),

Adding the combined signal (interference canceller 20 adding the combined signal S+n+I at 20) and the filtered signal (the LPF 26, 34, the 20 receives interference estimate from interference detector 18, Fig. 2) thereby remove the jammer signal (canceling out the interference signal by the summing function at 20, Fig 2, col. 3, lines 14-19; col.8, lines 23-49), the adder circuit (20) comprises a positive (+" terminal of 20, Fig. 2) and negative input ("-" terminal of 20), the combined signal being coupled to the positive input (delayed S+n+I is coupled to "+" terminal of 20), and the filtered signal being coupled to the negative input of adder (estimated interference signal is coupled to "-" terminal of 20). Cantwell fails to teach the wireless communication circuit, Tolson teaches multi-mode mobile phone (abstract, Fig. 5, page 1 first paragraph), for removing unwanted signals. Tolson teaches a mobile phone can remove the unwanted signal (abstract, Fig. 5), and can be implemented on compact ASIC (page 2, middle paragraph). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Cantwell with Tolson's mobile phone implementation for removing unwanted signal, such that unwanted signal could be implemented to mobile phone with compact ASIC.

Regarding **claim 12,** Tolson teaches a receiver and the received RF of combined signal with desired and unwanted signal. Tolson taught the down converted selected low frequency, the means for filtering by 10-11, the upconverting to selected RF by mixer 12, the means for adding at summer 5/8 desired and jammer with filtered signal at summer 5.

Regarding **claim 13**, Tolson teaches the quadrature communication circuit, the mixer 3/6, the means for filtering, the means for converting to selected rf. Andersen has shown above the combining the converted first and second signal.

Regarding **claim 20,** Cantwell teaches a method for reduction of distortion (Fig. 1-2, abstract) having a combined signal including a desired signal and a jammer signal (signal (s) + noise (n) + interference (I)), comprising filtering the combined signal to remove the desired signal and thereby provide a filtered signal representative of the jammer signal (the estimated interference signal at the output of interference detector 18, the LPF 26, 34 for extracting interference for up-converting the interference, Fig. 3, col. 8, line 57 to col. 9, line15), Adding the combined signal (interference canceller 20 adding the combined signal S+n+I at 20) and the filtered signal (the LPF 26, 34, the 20 receives interference estimate from interference detector 18, Fig. 2) thereby remove the jammer signal (canceling out the interference signal by the summing function at 20, Fig 2, col. 3, lines 14-19; col.8, lines 23-49), the adder circuit (20) comprises a positive (+" terminal of 20, Fig. 2) and negative input ("-" terminal of 20), the combined signal being coupled to the positive input (delayed S+n+I is coupled to "+" terminal of 20), and the filtered signal being coupled to the negative input of adder (estimated interference signal is coupled to "-" terminal of 20). Cantwell fails to teach the wireless communication circuit, Tolson teaches multi-mode mobile phone (abstract, Fig. 5, page 1 first paragraph), for removing unwanted signals. Tolson teaches a mobile phone can remove the unwanted signal (abstract, Fig. 5), and can be implemented on compact ASIC (page 2, middle paragraph). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Cantwell with Tolson's mobile phone implementation for removing unwanted signal, such that unwanted signal could be implemented to mobile phone with compact ASIC.

Regarding **claim 21**, Tolson teaches the method for receiving a rf signal at selected rf with combined signal of desired and unwanted, the converging the added signal to low frequency at mixer 6 coupled to filters 10-11, the converting the filtered signal to selected rf at mixer 12 outputs for sending signal to the adding at summer 5 to add the received desired and unwanted with the filtered converted signal.

Regarding **claim 22**, Tolson teaches the method for receiving a rf signal at selected rf with combined signal of desired and unwanted, the converging the added signal to low frequency at mixer 6 coupled to filters 10-11, the converting the filtered signal to selected rf at mixer 12 outputs for sending signal to the adding at summer 5 to add the received rf and the filtered rf signal to cancel the unwanted jammer signal.

Regarding **claim 23**, Tolson teaches the wireless communication GSM receiver is a quadrature circuit for converting rf signal to first and second quadrature components at selected frequency, the I/Q high pass filters 10-11 and the up conversion mixer 12, the combining of the upconverted signals in 12 (Fig. 5).

Regarding **claim 24**, Tolson teaches the splitting the combined converted signal into two quadrature signal I, Q (8, 9, page 4 third paragraph, page 5 first paragraph), the adder circuit comprising fist and second adder portion for adding first split signal, and the combined signal, and the second split signal and the combined signal (the two inputs to summer 5, page 5 third paragraph).

Regarding **claim 26**, Tolson teaches the base band I, Q at 8-9 (as shown above) and the high pass filters 10-11 (above).

Regarding **claim 27**, Tolson teaches the analog filter (the filters 14-15, 10-11, page 6 lines 5-6).

Regarding **claim 28**, Tolson teaches the wireless communication unit has specified operational bandwidth (page 4, fourth paragraph, GSM 25 MHz), and filter has filter bandwidth based on the operational bandwidth (the selecting pass band for a particular mode of operation, page 6, line 10-12, the multi-mode mobile phone, page 1, lines 1-2).

Response to Arguments

4. Applicant's arguments with respect to claims 1-6, 8-14, 17-24, 26-28, 31, 33-34 have been considered but are moot in view of the new ground(s) of rejection.

Regarding applicant's declaration under 37 CFR 1.131 having earlier invention disclosing date 1/29/2001 than the cited reference Takada (US 2002/0155,812 A1), the ground of rejection has been changed to include Cantwell (US 5,410,750). Cantwell teaches the combined signals signal (S)+noise (n)+interference (I), the interference detector 18, the extracted interference signal estimation at the "-" terminal of interference canceller 20 for summing the delayed combined signal (S)+noise (n)+interference (I) at "+" terminal at 20 to cancel the interference signals (abstract, Fig. 1-2, col. 3, lines 1-19).

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Chow whose telephone number is (703)-306-5615.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Urban, can be reached at (703)-305-4385.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to: (703) 872-9306 (for Technology Center 2600 only).

Hand-delivered responses should be brought to 220 South 20th Street, Crystal Plaza Two, Lobby, Room 1B03, Arlington, VA 22202 (Customer Window).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

Charles Chow C.C.

January 10, 2005.

EDWARD F. URBAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600